Materials Safety Data Sheet

Silver Nitrate

Created: May. 21, 2007
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1. Chemical Substances and Company Information

Name of Chemical Substance:	Silver nitrate (I)
Company Name:	Toyo Chemical Industrial Co., Ltd.
Address:	2-26-13, Naka-Izumi, Komae-City, Tokyo
Tel.:	+81-3-3489-5152
Fax:	+81-3-3488-1706
Emergency Contact:	As above
Recommended Applications and Use Restrictions:	Silver plating, silver powder, antibacterial agents, mirrors, analytical test drugs, catalysts

2. Summary of Hazards

GHS Classification

Physicochemical hazards	Explosives	Outside classification
	Flammable/combustible gas	Outside scope of classification
	Flammable/combustible aerosol	Outside scope of classification
	Burnable/oxidation gas type	Outside scope of classification
	High-pressure gas	Outside scope of classification
	Flammable liquid	Outside scope of classification
	Flammable solid	Outside classification
	Autoreactive chemicals	Outside classification
	Spontaneously combustible liquids	Outside scope of classification
	Spontaneously combustible solids	Outside classification
	Self-heating chemicals	Outside classification
	Hydration-reactive flammable chemicals	Outside classification
	Oxidizing liquids	Outside scope of classification
	Oxidizing solids	Class 2
	Organic peroxides	Outside scope of classification
	Metal-corroding substances	Cannot classify
Damage to health	Acute (oral) toxicity	Class 4
	Acute (percutaneous) toxicity	Cannot classify
	Acute (inhaled: gas) toxicity	Outside scope of classification
	Acute (inhaled: vapor) toxicity	Cannot classify
	Acute (inhaled: dust) toxicity	Cannot classify
	Acute (inhaled: mist) toxicity	Cannot classify
	Skin corrosiveness and irritation	Class 1A to 1C
	Critical injury to eyes and eye irritation	Class 1
	Respiratory organ sensitization	Cannot classify
	Skin sensitization	Cannot classify
	Germ-cell mutagenicity	Cannot classify
	Carcinogenicity	Cannot classify
	Reproductive toxicity	Class 2
	Specific marker organ and systemic toxicity (single exposure)	Class 1 (hematological system)
	Specific marker organ and systemic toxicity (single exposure)	Class 3 (Airway irritation)
	Specific marker organ and systemic toxicity (repeated exposure)	Class 1 (Lung, kidney, and cardiovascular systems)
	Inhalable respiratory organ harmfulness	Cannot classify

Damage to the environment	Acute aquatic environmental harm	Class 1
	Chronic aquatic environmental harm	Class 1

Label Elements

Picture descriptions and labels:

Cautionary terms: Danger

Hazard information:

Risk of fire accelerant: Oxidation substance
Harmful if ingested
Critical eye injury
Critical skin chemical burns
Suspected risk of malign influence on reproductive functions or fetus
Risk of organ (hematological system) damage and respiratory organ irritation
Organ (lung, kidney, and hematological system) damage due to long-term or repeated exposure
Extremely strong poison to aquatic life
Extremely strong poison to aquatic life due to long-term effects

Cautions:

[Safety Measures]

Obtain the user manual before use.
Do not handle until all safety precautions and readings are understood.
Keep away from ignition sources such as heat, fireworks, naked flames, and high temperatures. No smoking.
Do not spray on naked flames or other ignitions sources.
Take preventive measures to avoid mixing with flammable or prohibited substances.
When using the product, do not eat, drink, or smoke.
Use only outdoors or in a well-ventilated area.
Wear protective gloves, goggles, and face mask.
Prevent contact with eyes, skin, and clothing.
Do not inhale the dust.
Wash hands thoroughly after handling.
Avoid discharging into the environment.

[Emergency Measures]

If the substance contacts the eye, irrigate with water thoroughly for several minutes. If contact lenses can be removed easily, remove and wash them.
If eye irritation persists, consult a physician and receive treatment.
If clothing is spattered, promptly remove and isolate all soiled clothing.
Wash contaminated clothing before reuse.
If the substance adheres to the skin, wash using copious amounts of soap and water.
If skin irritation occurs, consult a physician and receive treatment.
If exposed or fear exposure, consult a physician and receive diagnosis treatment.
If ingested, rinse out the mouth, and immediately consult a physician for treatment.
If inhaled: Consult a physician promptly.
If you feel unwell, consult a physician to receive diagnosis and treatment.
Gather any leaks.

[Storage]

Lock the storage location.
Store separately from flammable and other prohibited materials.

[Disposal]

If discarding contents or containers, entrust to a specialized waste disposal company.

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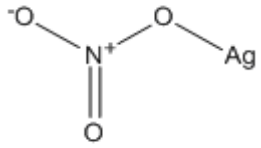
3. Composition and Component Information

Chemical Substance

Chemical name or general name:	Silver nitrate (I)
Molecular formula (molecular weight):	$AgNO_3$ (169.87)
Chemical characteristics (chemical or structural formula):	Silver nitrate 
CAS No.:	7761-88-8
Reference numbers in gazetted list in japan(CSCL and ISHL):	1-8
Impurities and stabilization additives that contribute to the classification:	No data
Concentration or concentration range:	99.9% min.

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4. Emergency Measures

If inhaled:	Causes irritation and chemical burns to the mucous membranes of the nose, throat, and bronchus. Blow nose and gargle. Consult a physician if necessary.
Adhesion to skin:	Irritates and corrodes skin. Wash with copious amounts of water. Consult a physician if the corrosion is severe.
Contact with eyes:	Causes a feeling of contamination, and irritates the membranes. Wash using dilute salt water and copious amounts of water, and then consult a physician.
If ingested:	Drink copious amounts of tepid water, lukewarm salt water, milk, and egg whites, etc., to induce vomiting, and then consult a physician.
Predicted acute symptoms and delayed onset symptoms:	Eye pain, and severe chemical burns
Most important signs and symptoms:	No information
Protection of people implementing emergency measures:	Rescuers should wear suitable protective equipment according to the circumstances.
Special precautions for physicians:	No information

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5. Measures during Fires

Flame retardants:	Water jets, foam retardants, powder retardants (excluding hydrogen carbonate), dry sand, etc.

Characteristic dangers:	There is a risk of exacerbating fires. Strong heat causes harmful gas (NOx) to be emitted, so wear protective equipment when firefighting.
Extinguishants that must not be used:	Carbon gas, and hydrogen carbonate powder retardants
Characteristic extinguishing methods:	Promptly move containers in the vicinity of the fire to a safe location. If moving is not possible, scatter water on the containers and their surroundings to cool.
Protection of firefighters:	Fight fire from upwind, and avoid inhaling poisonous gasses, etc. Wear respiratory protectors depending on the circumstances. Keep upwind all personnel unnecessary to disaster prevention activities.

6. Measures during Leaks

Physical precautions, protective equipment, and measures during emergencies:	Cordon off the periphery of the dispersal area to prohibit the entrance of personnel. When working, wear protective equipment to prevent the inhalation of spattered adhesions, dust, and gas, etc., and work from upwind. Remove all ignition sources.
Environmental precautions:	Make sure there is no discharge of the product or unprocessed thick effluent into rivers, etc.
Collection and neutralization:	Collect any spatter in a container, and then add saline to create silver chloride and collect the silver, and then flush away using copious amounts of water.
Preventing secondary accidents:	Prevent inflow to drainage ditches, sewers, cellars, or sealed locations.

7. Handling and Storage Precautions

Handling

Technical measures:	No naked flames. Avoid shock and high temperatures. Beware of contact with flammable materials, organic materials, and reducing substances, etc.
Local exhaust and overall ventilation:	Ideally, handle in locations with local exhausters and overall ventilators.
Precautions for safe handling:	Do not handle until all safety precautions and readings are understood. Prohibit the use of high-temperature devices, sparks, and naked flames in the vicinity. When using the product, do not eat, drink, or smoke. Do not touch, inhale, or drink. Prevent contact with eyes, skin, and clothing. Do not inhale dust, fumes, or mist. Use only outdoors or in a well-ventilated area. Wash hands thoroughly after handling. If not using deliberately, avoid discharging into the environment.

Storage

Technical measures:	Store hazardous materials in their storage location, and install the lighting, illumination, and ventilation necessary for handling.
Storage conditions:	Avoid contact with heat, shock, friction, flammable materials, reducing substances, and oxidants during storage. Avoid storing with foodstuffs. Prevent spatter, leaks, discharge, seepage into the floor, and theft, etc., during storage.

Incompatible substances:	Avoid contact with heat, reducing substances, and oxidants during storage.
Container and packing materials:	Airtight containers (glass, polyethylene, stainless steel, etc.)

8. Exposure Avoidance and Protection Measures

Control concentration:	No data
Tolerable concentration:	
Japan Society for Occupational Health (2007)	0.01mg/m^3 (as Ag)
ACGIH (2007 version)	TWA 0.1mg/m^3 (as Ag) TWA 0.01mg/m^3 (as soluble Ag)
Equipment measures:	Install local exhausters, and eye and hand washing facilities, in the handling locations.
Protective Equipment	
Respirator:	Poison masks (respirator during fires), and dust masks
Hand protective equipment:	Wear protective gloves. (Rubber gloves, etc.)
Eye protective equipment:	Wear eye protective equipment. (Goggles, etc.)
Skin and body protective equipment:	Wear protective face equipment, clothing, and protective shoes, etc. (Protective clothing, protective boots, etc.)
Hygiene measures:	When using the product, do not eat, drink, or smoke. Wash hands thoroughly after handling.

9. Physical and Chemical Properties

Physical properties, shape, and color, etc.:	Colorless to white crystalline powder
Odor:	Slightly acidic odor
pH:	Weak acidity when dissolved in water
Melting point and coagulation point:	212°C (melting point)
Boiling point, initial boiling point, and boiling range:	No data
Ignition point:	No data
Explosion range:	No data
Vapor pressure:	No data
Vapor density (vapor=1):	No data
Specific gravity (density):	d^{19} 4.35
Solubility:	Water: 20°C 215.7 g/100ml Ethanol 15°C 3.8 g/100g Acetone 15°C 0.35 g/100g
Octanol/water partition coefficient:	No data
Spontaneous ignition temperature:	No data
Dissolution temperature:	Dissolves at 444°C
Odor threshold value:	No data
Vaporization speed (butyl acetate=1):	No data
Burnability (solids and gas):	No data
Viscosity:	No data

10. Stability and Reactivity

Stability:	Has properties that oxidize other substances, and when mixed with flammable substances, dissolves due to heat/shock/friction, etc., to cause fierce burning. In the presence of organic residue, the silver separates and discolors due to light.
Possibility of harmful reactions:	Substance is an oxidant, and reacts with flammable substances and reducing substances.
Conditions to be avoided:	Light and heat
Incompatible substances:	Flammable substances and reducing substances
Hazardous degradable organisms:	Silver and NO_X

11. Harmfulness Information

Acute toxicity:	Oral lethal dose 10g Mouse oral: LD50; 50mg/kg Rat oral: LD50; 1,173mg/kg Mouse intraperitoneal: LD50; 17mg/kg Rat intraperitoneal: LD50; 83mg/kg
Skin corrosiveness and irritation:	Mild skin irritation. Skin irritation: Rabbit; 500mg/24hr mild
Critical injury to eyes and eye irritation:	Eye irritation: Rabbit; 10mg strong
Respiratory organ and skin sensitivity:	No data
Germ-cell mutagenicity:	No data
Carcinogenicity:	No data
Reproductive toxicity:	No data
Specific marker organ and systemic toxicity (single exposure):	No data
Specific marker organ and systemic toxicity (repeated exposure):	Risk of organ (skin and respiratory organ) damage due to long-term or repeated exposure.
Inhalable respiratory organ harmfulness:	No data

12. Environmental Impact Information

Ecotoxicity:	Toxic to aquatic environment life forms, and affects the ecosystem.
Persistence and degradability:	No data
Bioaccumulation:	No data

13. Disposal Precautions:

Residual waste:	Collect the silver using a roasting and reduction process, or an oxide precipitation process. During roasting, gasses containing NOx are emitted, so do not roast using an incinerator without cleaning equipment. (Ideally, entrust to a specialized company.)
Dirty containers and packaging:	Suitably process containers according to the relevant regulations and local government standards. When disposing of empty containers, make sure to discard the contents completely.

14. Shipping Precautions

International Regulations

Maritime Regulations Information	Obey International Maritime Organization regulations.
Aviation Regulations Information	Obey International Civil Aviation Organization/International Air Transport Association regulations.
UN No.:	1493
Proper Shipping Name:	Silver nitrate
Class:	5.1
Sub Risk:	
Packing Group:	II
Marine Pollutant:	

Japanese Regulations

Land Regulations Information	Obey Poisonous and Deleterious Substances Control Law and Fire Services Act regulations.
Maritime Regulations Information	Obey Ship Safety Law regulations.
Aviation Regulations Information	Obey the Civil Aeronautics Law.
UN No:	1493
Proper Shipping Name:	Silver nitrate
Class:	5.1
Sub Risk:	
Packing Group:	II

Special Safety Measures	During transport, avoid direct sunlight, and load so that the containers are not damaged, corroded, or leaking, and secure the load to prevent toppling. Do not transport together with food or livestock feed. Yellow card display is required during transport.
Urgent Measures during a Crisis Policy Number	140

15. Applicable Laws

Fire Service Act:	Class 1 hazardous material: Nitrates; Class 3 oxidizing solid (designated quantity: 1,000kg)
Poisonous and Deleterious Substances Control Law:	Deleterious substance not for pharmaceutical use
Industrial Safety and Health Law:	Hazardous material (oxidizing substance) Notifiable substance (Article 57-2, government ordinance Article 18-2 attached table No. 9-137)

Pharmaceutical Affairs Law:	Powerful drug, and designated drug
PRTR:	Class 1 designated chemical substance (attached table 1-82)
Act on Port Regulations:	Hazardous material (oxidizing substance)
Civil Aeronautics Act:	Oxidizing substance (class 2)
Regulations for the carriage and storage of dangerous goods in ship:	Oxidizing substance (class 2)

16. Other Information

Bibliography:

Reagent guidebook (Revised 2003)
Collection of Poisonous Materials Standard Notifications (Revised and enlarged edition 1991)
Dictionary of Chemistry (1987 30th printing: Kyoritsu Shuppan)
Chemistry and Applications of Precious Metal Elements (1984 Kodansha)
Hazardous Materials Safety Management (Ver. 4 Japan Association for Safety of Hazardous Materials)
12996 Chemical Products (1996 The Chemical Daily)
Chemical Substances Control Law chemical substance (METI)
Collection of Chemical Product Laws (1992 The Chemical Daily)
RTECS (2008)
Journal of the Japan Society for Occupational Health (2007)
GHS classification results database: NITE website
GHS model MSDS information: JISHA website

*Caution:

Hazard and harmfulness evaluations were created using the data and information available at the current time, but is not necessarily thorough, so handle with care.

Further, the data and evaluations described herein are not in any way guaranteed. The descriptions refer to normal handling, so for special handling, first implement safety measures conforming to the new application and methods of use.

This MSDS is translated into English.(Original version is Japanese)